



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,750	11/10/2003	Morten Muller	606-44-PA	4292
22145	7590	05/18/2006		
KLEIN, O'NEILL & SINGH 2 PARK PLAZA SUITE 510 IRVINE, CA 92614			EXAMINER BHAT, NINA	
			ART UNIT 1764	PAPER NUMBER

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/705,750

**Applicant(s)**

MULLER, MORTEN

**Examiner**

N. Bhat

**Art Unit**

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 36-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-45 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-35, drawn to an apparatus, classified in class 422, subclass 224.
  - II. Claims 36-45, drawn to a process, classified in class 208, subclass 210.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used for the materially different process of mixing only liquids.

3. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Howard Klein on 4/21/2006 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-35. Affirmation of this election must be made by applicant in replying to this Office action. Claims 36-45 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Action on the merits of claims 1-35 follows:

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1764

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 1-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih US Patent 5,904,907.

Shih teaches the invention substantially as claimed. Shih teaches a horizontal box mixing chamber for a multi-bed, down flow catalytic reactor which includes two top openings through which liquid and /or gaseous reactant streams pass into the mixing chamber. Inside the mixing chamber, the two streams collide with each to achieve mixing. Specifically the first inlet directs a first stream of inlet fluid in a first direction, a second inlet directs a second stream of inlet fluid in a second direction generally opposite to the first direction a first plurality of chevrons arranged along a first line, a second plurality of chevrons arranged along a second line. The mixing chamber is a mixing box which includes two rows of spaced chevrons and a collision zone between the rows of spaced chevrons. The chevrons are arranged to improve the mixing within the collision zone where the two inlet streams collide. [Note Column 2, lines 39-65] The inlet openings are sized to accommodate the flow of reactant without causing significant pressure drop. The area of the two inlet openings is between 0.2 and 5 percent of the total cross-sectional

Art Unit: 1764

area of the reactor which results in a pressure drop across the mixing chamber of less than 3 psia. The wedged shape or chevron shaped baffles or mixing elements cause turbulence in the fluids which improves the mixing of the liquid and vapor phases of the reactant stream which occurs in the central collision zone.

However, Shih does not teach the velocity of the liquid or gas within the reactor nor specifically teach nor that the combined flow of liquid and vapor is contacted to flow through each mixing orifices at no slip two phase flow conditions.

Shih does teach a horizontal box type mixer which includes baffles which improve mixing within the mixing zone and further teaches that while entering the mixing zones the orifices are sized to minimize pressure drop through the mixer chamber, specifically the pressure drop through the chamber is less than 3 psia. Applicant has taught in the specification that certain criteria regarding the height of the mixing chamber, the pressure drop within the mixing chamber and turbulent flow conditions within the mixing chamber and orifice size and velocity of the fluids entering the mixing chamber are criteria which affect the overall performance of the mixing chamber. It is maintained that Shih provides a mixing chamber which meets applicant's overall criteria of a mixing chamber for co-current flow of liquid and vapor in catalytic reactor wherein the orifice and the pressure drop has been specifically designed to provide fully mixed streams which pass out of the mixing chamber, the mixing chamber being a horizontal box type mixer which includes chevron shaped baffles which provide turbulence which improves the mixing of the liquid and vapor phases of the reactant streams which occurs in the central collision zone thus provide improved and complete reaction although the velocities of fluids are not specifically recited the apparatus as taught by Shih is capable of operating at no-slip

Art Unit: 1764


conditions or operated at the velocities recited by applicant and to optimize the reactor conditions based on the teaching of Shih which provides best results would have been obvious to one having ordinary skill in the art at the time the invention was made.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Strangeland et al. teach a distributor assembly of multibed down flow catalytic reactors. Muller teaches a two phase distribution apparatus and process. Kelly et al. teach a two phase fluid heat exchange. Jacobs et al. teach a reactor distribution apparatus including a quench and mixing zone. Nelson et al. teach a reactor apparatus and quench zone mixing apparatus. Wentinck teaches a mixing device used in catalytic partial oxidation. Perry et al.'396 and '346 teach fluid mixing and distribution apparatus.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Bhat whose telephone number is 571-272-1397. The examiner can normally be reached on Monday-Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**NINA BHAT**  
**PRIMARY EXAMINER**  
**GROUP 1300 1764**